

PATENT ABSTRACTS OF JAPAN

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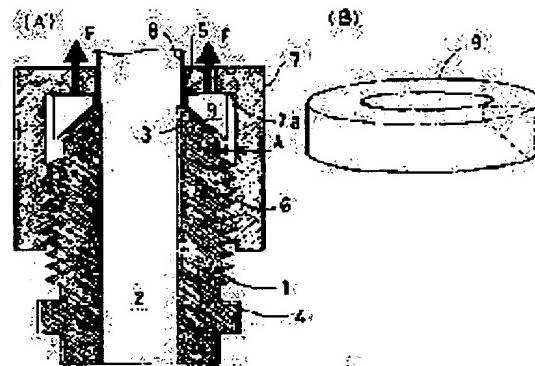
(21)Application number : 2001-077966 (71)Applicant : FUJITSU GENERAL LTD
 (22)Date of filing : 19.03.2001 (72)Inventor : MARUNO TAKASHI

(54) JOINT

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a joint preventing stress corrosion cracking of a flare nut.

SOLUTION: The joint comprises a half union 4 provided with a male screw 1 in an outer circumference part and a tapered inclined part 3 in a tip, the cross sectionally U-shaped flare nut 7 provided with an insertion hole 5 in a center position of a bottom face 7a and a female screw 6 screwed to the male screw 1, a connecting pipe 8 with a tip flared after passing through the insertion hole 5, and a washer 9 provided between the bottom face of the flare nut 7 and the inclined part of the half union 4 so as to press the tip of the connecting pipe 8 against the inclined part and having front and rear faces respectively parallel to the bottom face 7a of the flare nut 7 and the inclined part of the half union 4. When connecting the connecting pipe 8 to the half union 4, the male screw 1 is screwed in the female screw 6, and the tip of the connecting pipe 8 is pressed against the inclined part 3 of the half union 4 via the washer 9.



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CLAIMS

[Claim(s)]

[Claim 1] The half union which equipped the periphery section with the male screw and was equipped with the taper-like ramp at the tip, The brake pipe connection of a cross-section concave which equipped the center position at the bottom with the insertion hole, and was equipped with the female screw screwed in said male screw, Between the communication trunk which flared the point after inserting in said insertion hole, and the base of said brake pipe connection and the ramp of said half union Are prepared so that the pressure welding of the point of said communication trunk may be carried out to this ramp, and it consists of a washer with a front rear face respectively parallel to the base of said brake pipe connection, and the ramp of said half union. The pipe joint characterized by screwing the female screw of said brake pipe connection in the male screw of said half union, and coming to carry out the pressure welding of the point of said communication trunk to the ramp of said half union through said washer in case said communication trunk is connected to said half union.

[Claim 2] The pipe joint according to claim 1 characterized by being formed and said insertion hole becoming so that said communication trunk may be inserted in without a clearance.

[Claim 3] The pipe joint according to claim 1 or 2 with which the feed hole of said washer is characterized by coming to consider as few ***** rather than said insertion hole.

[Claim 4] The pipe joint according to claim 1 or 3 which makes it the description as a clearance becomes to be able to be impossible between the outer diameter of said washer, and said brake pipe connection when the pressure welding of the point of said communication trunk is carried out to the ramp of said half union.

[Claim 5] Claim 1 characterized by said washer consisting of a member which has corrosion resistance and rigidity, a pipe joint according to claim 3 or 4.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is used for an air conditioner and relates to the structure of the pipe joint which connects the communication trunk which makes refrigerant passage.

[0002]

[Description of the Prior Art] As drawing 2 (A) shows the conventional pipe joint used for an air conditioner. The half union 4 which equipped the periphery section with the male screw 1, equipped the interior with the feed hole 2, respectively, and was equipped with the taper-like ramp 3 at the tip. The brake pipe connection 7 which equipped the center position of a base parallel to said ramp 3 with the insertion hole 5, and was equipped with the female screw 6 screwed in said male screw 1. It consists of a communication trunk 8 which flared the point after inserting in said insertion hole 5. In case said communication trunk 8 was connected to said half union 4, it was the configuration which screws and binds the female screw 6 of said brake pipe connection 7 tight to the male screw 1 of said half union 4, and comes to carry out the pressure welding of the point of said communication trunk 8 to the ramp 3 of said half union 4.

[0003] However, when said brake pipe connection 7 was screwed and bound tight in said half union 4, corrosion advanced and proof stress declined with lateral stress again especially among the stress F of the direction of slant which said brake pipe connection 7 shows by drawing 2 (A), it had the problem of causing a stress corrosion crack like the a section shown by drawing 2 (B).

[0004]

[Problem(s) to be Solved by the Invention] This invention aims to let a brake pipe connection offer the pipe joint it was made not to cause a stress corrosion crack in view of the above-mentioned trouble.

[0005]

[Means for Solving the Problem] The half union which equipped the periphery section with the male screw and was equipped with the taper-like ramp at the tip in order that this invention might solve an above-mentioned technical problem. The brake pipe connection of a cross-section concave which equipped the center position at the bottom with the insertion hole, and was equipped with the female screw screwed in said male screw. Between the communication trunk which flared the point after inserting in said insertion hole, and the base of said brake pipe connection and the ramp of said half union Are prepared so that the pressure welding of the point of said communication trunk may be carried out to this ramp, and it consists of a washer with a front rear face respectively parallel to the base of said brake pipe connection, and the ramp of said half union. In case said communication trunk is connected to said half union, the female screw of said brake pipe connection is screwed in the male screw of said half union, and it has composition which carries out the pressure welding of the point of said communication trunk to the ramp of said half union through said washer.

[0006] Moreover, said insertion hole has composition formed so that said communication trunk might be inserted in without a clearance.

[0007] Moreover, the feed hole of said washer has composition made into few ***** from said insertion hole.

[0008] Moreover, when the pressure welding of the point of said communication trunk is carried out to the ramp of said half union, it has composition the clearance was made to be made between the outer diameter of said washer, and said brake pipe connection.

[0009] Furthermore, said washer has composition which consists of a member which has corrosion resistance and rigidity.

[0010]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail as an example based on a drawing. Drawing 1 is the explanatory view of the pipe joint by this invention, (A) is a sectional view and (B) is the perspective view of a washer.

[0011] The pipe joint by this invention carries out the pressure welding of the point of the communication trunk 8 which it flared corresponding to said ramp 3 after inserting the insertion

hole 5 of said brake pipe connection 7 in the ramp 3 of the shape of a taper formed at the tip of this half union 4 by screwing the brake pipe connection 7 of a cross-section concave in the half union 4, and binding it tight in the condition of having made the washer 9 intervening, as drawing 1 (A) shows.

[0012] Said half union 4 becomes by the product made from brass, it equips the periphery section with a male screw 1, equips the interior with a feed hole 2, and has composition equipped with said taper-like ramp 3 at the tip.

[0013] It becomes by said brake pipe connection 7 and the product made from brass, has said insertion hole 5 which inserts said communication trunk 8 in the center position of base 7a without a clearance, it has the female screw 6 screwed in the male screw 1 of said half union 4, and is formed in the cross-section concave, and especially said base 7a and the inner skin which follows said female screw 6 have composition mutually joined in the shape of a right angle.

[0014] After said communication trunk's 8 being tubing which makes the refrigerant passage of an air conditioner, becoming by copper and inserting in the insertion hole 5 of said brake pipe connection 7, corresponding to said ramp 3, it flares a point.

[0015] As said washer 9 has rigidity like high tensile steel, and it consists of a member which performed surface treatment so that it may not corrode, and drawing 1 (A) and drawing 1 (B) show A core is equipped with the feed hole which consists of said insertion hole 5 by few *****. Between base 7a of said brake pipe connection 7, and the ramp 3 of said half union 4 It is prepared so that the pressure welding of the point of said communication trunk 8 may be carried out to this ramp 3, and it has composition with a front rear face respectively parallel to base 7a of said brake pipe connection 7, and the ramp of said half union 4.

[0016] As drawing 1 (A) shows, when said communication trunk 8 is connected to said half union 4 by the above configuration, The point of said communication trunk 8 is extended corresponding to said ramp 3, after inserting in the insertion hole 5 of said brake pipe connection 7. By holding said washer 9 so that the flat side side may join to base 7a of said brake pipe connection 7, screwing the female screw 6 of said brake pipe connection 7 in the male screw 1 of said half union 4, and binding this brake pipe connection 7 tight The pressure welding of the point of said communication trunk 8 is carried out to the ramp 3 of said half union 4 by the inclined plane side of said washer 9.

[0017] In that case, between the periphery section of said washer 9, and said brake pipe connection 7 The stress F received when it is constituted so that the clearance A shown by drawing 1 (A) can be secured, and said brake pipe connection 7 was bound tight by this It becomes the stress of a lengthwise direction instead of the stress of the longitudinal direction leading to a transversal crack like the above-mentioned conventional technique, and said washer 9 which gave rigidity will take over almost all the stress F.

[0018] In addition, rather than said insertion hole 5, since the feed hole of said washer 9 is few *****, it can be smoothly slid in accordance with the appearance of said communication trunk 8, and it can carry out the pressure welding of the point of this communication trunk 8 correctly to said ramp 3.

[0019] moreover, the thing for which said washer 9 gave corrosion resistance and rigidity -- in addition -- since said insertion hole 5 inserts in said communication trunk 8 without a clearance -- a seal condition -- becoming -- further -- corroding -- being hard -- it can bear well enough to said stress F.

[0020]

[Effect of the Invention] As mentioned above, according to this invention, a brake pipe connection serves as a pipe joint it was made not to cause a stress corrosion crack.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view of the pipe joint by this invention, and (A) is a sectional view and (B) is the perspective view of a washer.

[Drawing 2] It is the explanatory view of the pipe joint by the conventional example, and (A) is a sectional view and (B) is the front view of a brake pipe connection.

[Description of Notations]

- 1 Male Screw
- 2 Feed Hole
- 3 Ramp
- 4 Half Union
- 5 Insertion Hole
- 6 Female Screw
- 7 Brake Pipe Connection
- 7a Base
- 8 Communication Trunk
- 9 Washer
- A Clearance
- F Stress

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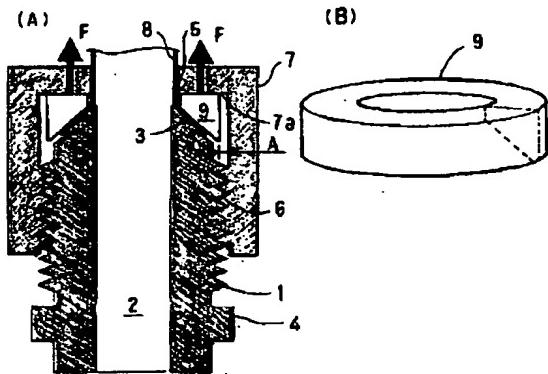
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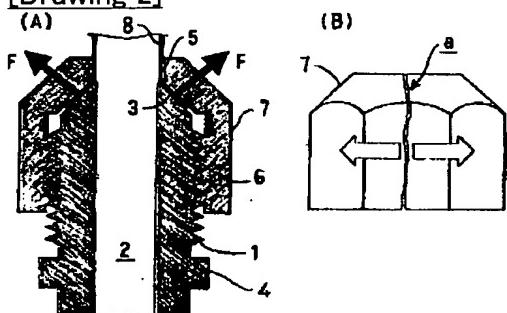
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DRAWINGS

[Drawing 1]



[Drawing 2]



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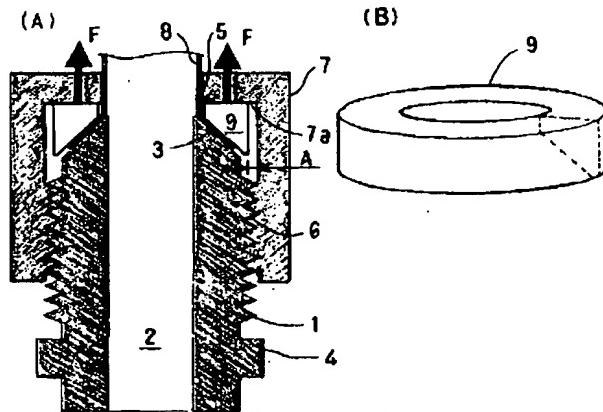
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(54)【発明の名称】 管継手

(57)【要約】

【課題】 フレアナットが応力腐蝕割れを起こさないようにした管継手を提供する。

【解決手段】 外周部に雄ねじ1を備え、先端に先細状の傾斜部3を備えたハーフユニオン4と、底面7aの中心位置に挿通孔5を備え、前記雄ねじ1に螺合する雌ねじ6を備えた断面凹状のフレアナット7と、前記挿通孔5を挿通したのち先端部がフレア加工された接続管8と、前記フレアナット7の底面と前記ハーフユニオン4の傾斜部との間に、同傾斜部に前記接続管8の先端部を圧接するように設けられ、前記フレアナット7の底面7aと前記ハーフユニオン4の傾斜部とに夫々平行な表裏面を有したワッシャ9とからなり、前記ハーフユニオン4に前記接続管8を接続する際、前記雄ねじ1に前記雌ねじ6を螺合し、前記ワッシャ9を介して前記接続管8の先端部を前記ハーフユニオン4の傾斜部3に圧接した。



【特許請求の範囲】

【請求項1】 外周部に雄ねじを備え、先端に先細状の傾斜部を備えたハーフユニオンと、底面の中心位置に挿通孔を備え、前記雄ねじに螺合する雌ねじを備えた断面凹状のフレアナットと、前記挿通孔を挿通したのち先端部がフレア加工された接続管と、前記フレアナットの底面と前記ハーフユニオンの傾斜部との間に、同傾斜部に前記接続管の先端部を圧接するように設けられ、前記フレアナットの底面と前記ハーフユニオンの傾斜部とに夫々平行な表裏面を有したワッシャとからなり、前記ハーフユニオンに前記接続管を接続する際、前記ハーフユニオンの雄ねじに前記フレアナットの雌ねじを螺合し、前記ワッシャを介して前記接続管の先端部を前記ハーフユニオンの傾斜部に圧接してなることを特徴とする管継手。

【請求項2】 前記挿通孔が、前記接続管を隙間なく挿通するように形成されてなることを特徴とする請求項1に記載の管継手。

【請求項3】 前記ワッシャの中心孔が、前記挿通孔よりも少許大径とされたことを特徴とする請求項1または請求項2に記載の管継手。

【請求項4】 前記接続管の先端部を前記ハーフユニオンの傾斜部に圧接した際、前記ワッシャの外径と前記フレアナットとの間に隙間ができるようにしてなることを特徴とする請求項1または請求項3に記載の管継手。

【請求項5】 前記ワッシャが、耐蝕性および剛性を有する部材からなることを特徴とする請求項1、請求項3または請求項4に記載の管継手。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、空気調和機に使用され、冷媒流路をなす接続管を接続する管継手の構造に関する。

【0002】

【従来の技術】 空気調和機に使用される従来の管継手は、図2(A)で示すように、外周部に雄ねじ1を、内部に中心孔2を夫々備え、先端に先細状の傾斜部3を備えたハーフユニオン4と、前記傾斜部3と平行な底面の中心位置に挿通孔5を備え、前記雄ねじ1に螺合する雌ねじ6を備えたフレアナット7と、前記挿通孔5を挿通したのち先端部がフレア加工された接続管8とからなり、前記ハーフユニオン4に前記接続管8を接続する際、前記ハーフユニオン4の雄ねじ1に前記フレアナット7の雌ねじ6を螺合して締め付け、前記接続管8の先端部を前記ハーフユニオン4の傾斜部3に圧接してなる構成であった。

【0003】 しかしながら、前記ハーフユニオン4に前記フレアナット7を螺合し締め付けた際、前記フレアナット7が、図2(A)で示す斜め方向の応力Fのうちとくに横方向の応力によって、また、腐蝕が進行して耐力

が低下してしまうことによって、図2(B)で示すa部のような応力腐蝕割れを起こしてしまうという問題を有していた。

【0004】

【発明が解決しようとする課題】 本発明は、上記問題点に鑑み、フレアナットが応力腐蝕割れを起こさないようにした管継手を提供することを目的としている。

【0005】

【課題を解決するための手段】 本発明は上述の課題を解決するため、外周部に雄ねじを備え、先端に先細状の傾斜部を備えたハーフユニオンと、底面の中心位置に挿通孔を備え、前記雄ねじに螺合する雌ねじを備えた断面凹状のフレアナットと、前記挿通孔を挿通したのち先端部がフレア加工された接続管と、前記フレアナットの底面と前記ハーフユニオンの傾斜部との間に、同傾斜部に前記接続管の先端部を圧接するように設けられ、前記フレアナットの底面と前記ハーフユニオンの傾斜部とに夫々平行な表裏面を有したワッシャとからなり、前記ハーフユニオンに前記接続管を接続する際、前記ハーフユニオンの雄ねじに前記フレアナットの雌ねじを螺合し、前記ワッシャを介して前記接続管の先端部を前記ハーフユニオンの傾斜部に圧接する構成となっている。

【0006】 また、前記挿通孔が、前記接続管を隙間なく挿通するように形成された構成となっている。

【0007】 また、前記ワッシャの中心孔が、前記挿通孔よりも少許大径とされた構成となっている。

【0008】 また、前記接続管の先端部を前記ハーフユニオンの傾斜部に圧接した際、前記ワッシャの外径と前記フレアナットとの間に隙間ができるようにした構成となっている。

【0009】 更に、前記ワッシャが、耐蝕性および剛性を有する部材からなる構成となっている。

【0010】

【発明の実施の形態】 以下、本発明の実施の形態を図面に基づいた実施例として詳細に説明する。図1は本発明による管継手の説明図で、(A)は断面図であり、(B)はワッシャの斜視図である。

【0011】 本発明による管継手は、図1(A)で示すように、断面凹状のフレアナット7を、ワッシャ9を介在させた状態でハーフユニオン4に螺合し締め付けることにより、同ハーフユニオン4の先端に形成された先細状の傾斜部3に、前記フレアナット7の挿通孔5を挿通したのち前記傾斜部3に対応してフレア加工された接続管8の先端部を圧接するようになっている。

【0012】 前記ハーフユニオン4は、黄銅製であり、外周部に雄ねじ1を備え、内部に中心孔2を備え、先端には先細状の前記傾斜部3を備えた構成となっている。

【0013】 前記フレアナット7、黄銅製であり、底面7aの中心位置に前記接続管8を隙間なく挿通する前記挿通孔5を備え、前記ハーフユニオン4の雄ねじ1に螺合

する雌ねじ6を備えて断面凹状に形成されており、とくに、前記底面7aと、前記雌ねじ6に連続する内周面とは、互いに直角状に接合された構成になっている。

【0014】前記接続管8は、空気調和機の冷媒流路をなす管であって銅製でなり、前記フレアナット7の挿通孔5を挿通したのち、先端部が前記傾斜部3に対応してフレア加工されるようになっている。

【0015】前記ワッシャ9は、例えば高張力鋼のような剛性を有し、また、腐蝕しないように表面処理を施した部材からなり、図1(A)および図1(B)で示すように、中心部に前記挿通孔5よりも少許大径である中心孔を備え、前記フレアナット7の底面7aと前記ハーフユニオン4の傾斜部3との間に、同傾斜部3に前記接続管8の先端部を圧接するように設けられ、前記フレアナット7の底面7aと前記ハーフユニオン4の傾斜部3とに夫々平行な表裏面を有した構成になっている。

【0016】以上の構成により、図1(A)で示すように、前記ハーフユニオン4に前記接続管8を接続する際、前記接続管8の先端部を、前記フレアナット7の挿通孔5を挿通したのち前記傾斜部3に対応して拡開し、前記ワッシャ9を、その平坦面側が前記フレアナット7の底面7aに接合するように収容し、前記ハーフユニオン4の雄ねじ1に前記フレアナット7の雌ねじ6を螺合し、同フレアナット7を締め付けることにより、前記ワッシャ9の傾斜面側によって前記接続管8の先端部を前記ハーフユニオン4の傾斜部3に圧接するようになっている。

【0017】その際、前記ワッシャ9の外周部と、前記フレアナット7との間に、図1(A)で示す隙間Aが確保できるように構成されており、これによって、前記フレアナット7が締め付けられたことによって受ける応力Fは、上記従来技術のような横割れの原因になる横方向の応力ではなく縦方向の応力となり、そのほとんどの応*

*力Fを剛性をもたせた前記ワッシャ9が引き受けくれることになる。

【0018】なお、前記ワッシャ9の中心孔は、前記挿通孔5よりも少許大径であるため前記接続管8の外形に沿って円滑にスライドし、同接続管8の先端部を前記傾斜部3に対し正確に圧接させることができる。

【0019】また、前記ワッシャ9は、耐蝕性および剛性をもたせたことに加えて、前記挿通孔5が前記接続管8を隙間なく挿通するので密封状態となって更に腐蝕にくくなり、前記応力Fに対し充分によく耐えることができる。

【0020】

【発明の効果】以上のように、本発明によると、フレアナットが応力腐蝕割れを起こさないようにした管継手となる。

【図面の簡単な説明】

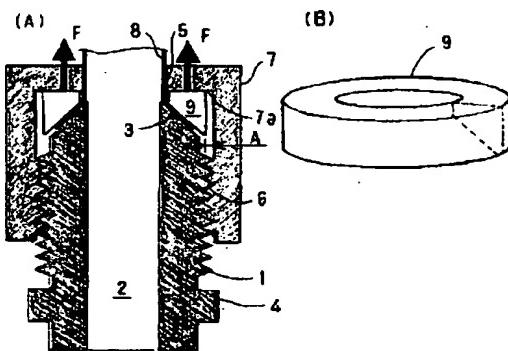
【図1】本発明による管継手の説明図で、(A)は断面図であり、(B)はワッシャの斜視図である。

【図2】従来例による管継手の説明図で、(A)は断面図であり、(B)はフレアナットの正面図である。

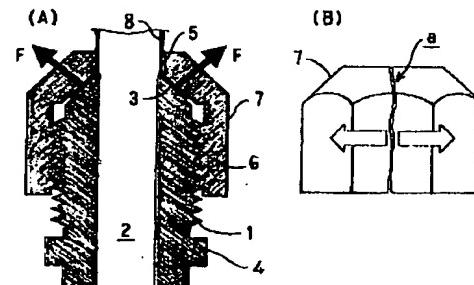
【符号の説明】

- | | |
|----|---------|
| 1 | 雄ねじ |
| 2 | 中心孔 |
| 3 | 傾斜部 |
| 4 | ハーフユニオン |
| 5 | 挿通孔 |
| 6 | 雌ねじ |
| 7 | フレアナット |
| 7a | 底面 |
| 8 | 接続管 |
| 9 | ワッシャ |
| A | 隙間 |
| F | 応力 |

【図1】



【図2】



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